with the presence or absence of a dot in the particular lengthwise column of the record material which it is scanning, and the photocell output, through one of the sensitive relays 60—65 is used to control one of the relays 70—75 in the power supply line between the source of power 67 and one of the six solenoids 76—81. Each of the solenoids 76 to 81 is comprised of a hollow coil through which one of the pins 41—46 extends. Thus each of the pins can be made to extend a short distance up above the surface of the plate 47 in accordance with the presence of an indicia in a particular location on the record medium 20'. Of course, any of the well-known lens systems may be utilized with this electro-optic pickup in place of the light tubes 66.

With the indicia 38 arranged in a single column instead of in a double column it is necessary that the six pickup devices 66 be arranged in a single column across the record member 20, as is shown in Fig. 4. The pins 41 to 46 which press against the readers fingers should, however, always be arranged in accordance with the established Braille system of two adjacent columns as shown in Figure 4. To do otherwise would require the operator to learn a new system which is highly disadvantageous.

Figure 5 is a diagram showing one of many possible circuits for actuating, in succession, each of two or more corresponding pins in their separate finger plates. It is to be understood that a complete device would include six circuits each of which is similar to the circuit of Figure 5, for raising simultaneously certain pins in the first finger plate depending upon the letter to be read, then, after a short time delay, for simultaneously raising the corresponding pins in the second finger plate, and then after another short time delay, for simultaneously raising the corresponding pins in a third finger plate. This gives the reader a feel of the letter through three fingers with a slight time delay between feeling the first and second impulses and another slight time delay between feeling the second and third impulses. By the time the third impulse reaches the reader through his third finger the next letter may already be formed on the first bank of pins. The human mind is such that it can segregate these two different pulses and can "presense" the second letter while reading the first letter. The result to an experienced Braille reader is greatly increased reading speed.

In Figure 5 the pickup device is shown as a variable resistance 53 connected to one side of a power supply such as battery 100. A solenoid 63 is connected between the output from the pickup 53 and the other side of the battery 100 so that upon a decrease in the resistance of the pickup 53 indicative of the passing of an indicia underneath the pickup the solenoid 63 is energized thereby causing the switch 63' to close. This connects the battery 100 through solenoid 73 causing switch blades 101, 102 to close against contacts 82, 83 respectively. Closing switch blade 101 against contact 82 connects the battery 100 through solenoid 79 causing the pin 44 to extend up through the finger plate 47. Pin 44, together with the other pins which extend up through finger plate 47, as shown in Figure 4, give the reader his first sense of the letter which is to be read. Simultaneously with the closing of switch 101, 82 the switch blade 102 engages the contact point 83. This, through switch blades 63', 81, connects battery 100 to a condenser 85 and current therefrom charges the condenser.

Upon the resistance of the pickup 53 increasing, signifying the passing of the indicia on the tape through the pickup head, the natural bias on the switch blade 63' causes it to spring open and break the circuit through solenoid 73. Switch blades 101, 102 break away from contact points 82, 83, respectively, thereby breaking the circuit through solenoid 79 causing pin 44 to drop and also breaking the circuit through condenser 85. When switch blade 102 returns to its normal position it engages contact point 84.

This connects the charged condenser 85 to a solenoid 86. Solenoid 86, upon being energized, closes the switch blades 87, 88 against contact points 89, 90, respectively. Closing switch 88, 90 connects solenoid 79' to the battery 100 and causes the pin 44' to rise above the finger plate 47'. Closing switch 87, 89 connects a condenser 92 to the battery 100, thereby charging the condenser 92. When the condenser 85 discharges through solenoid 86, the bias on the switch arms 87, 88 returns them to their normal position, causing the switch arm 87 to engage the contact 93, and breaking the contacts between arm 88 and point 90 and between arm 87 and point 89. Breaking the circuit through point 90 and switch arm 88 allows the pin 44' to fall, and making the contact between switch arm 87 and contact point 93 connects the fully charged condenser 92 to the solenoid 95. This causes the switch arm 96 to engage the contact point 97 and connects the battery 100 to the solenoid 79'' and raises the pin 44'' above the finger plate 47''. When the condenser 92 is discharged the bias on the switch arm breaks its contact with point 97 and allows the pin 44'' to drop.

While the pin 44'' is being raised and lowered, a second series of impulses can be in progress through the series of pins 44, 44' and 44''.

While there have been described what are at present considered to be the preferred embodiments of this invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is, therefore, aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. In a reader for the blind including a long narrow record member carrying indicia representative of a succession of letters; a device for reading said indicia comprising pickup means for sensing said indicia, means for driving said record member past said pickup means, electric circuit means connected to said pickup means and controlled by said pickup means in accordance with the indicia sensed by said pickup means, a first bank and a second bank of plungers each comprised of a plurality of movable plungers, said electric circuit means including plunger actuating means for actuating said plungers in accordance with electric current in said controlled electric circuit means for indicating to the reader by the sense of feeling the succession of letters which pass said pickup means, and time delay means in said electric circuit means for delaying the actuation of said second bank of plungers with respect to the actuation of said first bank of plungers.

2. A reader for the blind as set forth in claim 1, further characterized by said time delay means comprising condenser means.

3. In a reader for the blind including a long narrow record member carrying indicia repre-